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region large tracts of valuable alluvial land, which might be cultivated with great profit to the colony.

General LEFROY said, when his brother told us, with the experience of a settler of more than twenty years in West Australia, that the region he had been the first to explore contained an extent of valuable agricultural and sheep-farming country unequalled in the colony, it opened up some good news to those who were well-disposed towards that unfortunate colony. His brother dwelt very strongly upon this point, particularly upon the extraordinary richness of the granite in those felspars which were the element of agricultural fertility, wherever they were found. There was also great interest in the view which he announced as to the possibility of our having in this portion of the Australian continent access to the primeval nucleus of our planet, the primeval granite over which there has never been any great depth of sedimentary deposit, which has never been disturbed by fissures or disrupted by intrusive rocks, and which is nearly in the condition in which our globe would have been originally if it had been a granite sphere cooling gradually. Mr. Lefroy was deeply impressed with the evidence presented in many directions of the extreme antiquity of this region. We find in the vegetation of Australia the living representatives of the most ancient vegetation of the globe. It is the same with a portion of its animal kingdom, and also with its representatives of the human race. For example, the only native Australians met with by the expedition was one female and her child, both in a state of absolute nudity. The extraordinary sparseness of the human race, and the very peculiar conditions under which they exist there, point to a degree of primitive simplicity and antiquity which he thought would be found of considerable interest hereafter. Houseless through three-quarters of the year, perfectly naked in all weathers, and distributed over the country at a rate probably not exceeding one family to forty or fifty square miles, it is difficult to conceive of human beings in a deeper state of degradation. "Man," says Mr. Lefroy, in one of his letters, "is here only another species of the mammalian fauna who has the singular property of being both carnivorous and graminivorous, and is as unconscious of traditions, laws, moral principles, and social institutions as the scanty kangaroos or emus who share the country with him." The language of this female was unintelligible to the native from York who accompanied the party. No kindness could overcome her terror, or induce her to accept what they offered her. Having no personal acquaintance with Western Australia, General Lefroy could not venture to say how far his brother's anticipations of a beneficial change in the vegetation of those great plains, to be brought about by cattle-feeding, would be realized; but it would appear that a moderate expenditure of labour would remove the curse of aridity by saving the abundant water which is sent by heaven, but, in the singular conformation of the surface, finds no valleys to drain it off, no basins to collect it, and no depth of soil into which it can subside. It seems to evaporate with the minimum of benefit to the earth. The expedition had suffered much, both from the want of this necessary and from the muddiness of what they could collect. On one occasion they were 36 hours without it; but, notwithstanding this, he was glad to say they lost only two or three horses, and returned themselves all the better for their hardships.

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The next two Papers related to New Zealand, and were therefore read consecutively. They were respectively entitled—

(a.) *Expedition to the West Coast of Middle Island, New Zealand (Otago Province).* By JAMES HECTOR, M.D., &c., and

(b.) *Survey of the Lake Districts of the Province of Otago.* By JAMES M'KERROW, Esq., District Surveyor.

DR. HECTOR's party were absent from January to March, during which period, after proceeding up the valley of the Waitaki and thence into that of the Ahuriri, they traversed the magnificent plains across which lies the boundary-line between Otago and Canterbury, and gained the river Clutha. This they followed up to the Wanuka Lake, whence they had to push forward on lightly-packed horses. They now followed the Matuki-tuki River, where the headquarters were fixed for farther exploration westwards. As they advanced they began to see the ice-pinnacles of Mount Aspiring, a beautiful and very abrupt cone, which dominates over the other lofty ranges of the region. Hereabouts a noble forest of beech covered the hillsides to a height of 2000 feet, the scenery being magnificent, with noble cascades leaping several hundred feet down the sheer face of the precipice (in one instance 1200 feet), the water being dispersed in spray ere it reaches the valley below. Farther on, amid a profusion of white-blossomed willow-trees, the river enters a deep gorge, on emerging from which a fine view is obtained of the glaciers that descend from the flanks of Mount Aspiring. At this point it was found impossible to take the horses further, which were therefore left at a secure point, while the party advanced on foot—a most arduous march over huge boulders, especially as each man had to carry a light pack of 50 lbs., afterwards reduced to 25 lbs. At length, after leaving the wooded belt, which here reaches an elevation of 3500 feet, they gained the source of the Matuki-tuki, in two enormous old glaciers. At this point, close to the north-west boundary-line of Canterbury Province, they ascended a saddle-hill, 5500 feet high, overlooking a grand glacier in the valley below, 500 feet thick, and named after Dr. Haast, while immense masses of pinnacled mountains filled the valley below. The descent on the farther side was so precipitous as to be exceedingly dangerous, and after crossing the foot of Haast's glacier they struck a river named after the same eminent geologist, which passes through numerous gloomy gorges. Here they climbed another peak (elevation not stated), whence they had a view of the sea, 15 miles distant. To the left of the landscape was the glacier of Mount Richards, in which the Jackson rises. They now attempted to push on, and in doing so discovered track-marks, at first supposed to be made by Maories, but which Dr. Hector, on minute examination, pronounced to be those of birds, either extinct or exceedingly rare (possibly Moas). These never entered the woods, the magnificence of which in this region must be seen to be appreciated, even the *fuchsia* and *tutu*

growing into trees with trunks 2 feet in diameter. An ineffectual attempt was now made to descend the Jackson; but the rain proved an insurmountable hindrance, and they had to stop within eight miles of the sea. In returning they suffered severely from famine, but ultimately reached their various *caches* without mishap.

[The foregoing is the latest intelligence received; but Dr. Hector has gone round in a schooner to the west coast, whence he is said to have sailed up a stream into a large lake, within easy distance of Lake Wakatipi. But no report of this has yet reached England.\*]

(b.) This was a survey of 4883 square miles in the province of Otago; the general result of which was to establish, as the most striking physical feature of the country, the very sudden differences of elevation which diversify its surface, the gorges or valleys being generally filled by lakes. The mountains range from 4000 to 9000 feet, the line of perpetual congelation being 8000 feet. The ranges usually run from N.N.E. to S.S.W. directly across the track of the prevailing winds in the Pacific, and hence they materially affect the climatology of the island by acting as condensers of the vapour-laden atmospheric currents, which but for their interposition might pass over the island without parting with their moisture. The snow-line was higher on the north-west, or windy side of the mountain, than on the other side; hence the floodmarks of the rivers show rises and falls of almost incredible amount; some of those running into the Te-Anau and Manipori Lakes (which drain a region of hundreds of square miles, and are themselves of immense area), showing a difference of level between winter and summer of as much as 9 feet. Such basins serve in great measure to regulate the otherwise overwhelming impetuosity of the streams, by confining them within a regular channel, instead of presenting a mere useless wide shingle-bed to the very edge of the sea. These lakes show geological traces of their having been at a remote period of much greater extent than they are now. At present they are supposed to be hundreds of feet in depth; their sides, like those of the sea-fiords at the lower end of the north-west side having frequently no beaches of any sort, the rocks rising sheer out of the water to several hundred feet in height. Of the country surveyed, 1636 square miles was pastoral country in detached sections, 959 was forest, chiefly beech, pine, and *totaru*, and 1960 barren mountain—the remaining 328 square miles being lake or river.

The PRESIDENT said this was the first time the physical geography of the southern portion of New Zealand had been opened out to us. The task had been performed in an admirable manner in both communications, and the results of

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\* Just as the present number of Proceedings is passing through the press, a narrative of the Expedition has come to hand.

the exploration were certainly very striking, considering the enormous difficulties these two gentlemen had to encounter. Dr. Hector was the well-known naturalist, geologist, and geographer who accompanied Captain Palliser in his expedition to the Rocky Mountains, and he was very well entitled to be recommended as the Chief of the present exploration. Among other striking features alluded to, Dr. Hector spoke of certain tracks, which he described as paths that only could have been followed by great birds, of which a skeleton was to be seen at the British Museum, and of which we had recently had reports that some of the species were still living. He had also alluded to the glaciers of the country. Dr. Hector described a great mass of erratic blocks and large moraines that had been brought down by glaciers of still greater extent than those now existing there. In fact, the whole of the western coast of New Zealand was a highly Alpine region. The President further stated that he had received from Dr. Haast, the Provincial Geologist of Canterbury, in New Zealand, a most valuable memoir, describing a map of that province and illustrated by numerous exquisite pictorial sketches of mountains and glaciers, which would be read at the next Meeting.

Mr. HARPER asked to be allowed to point out a route which he took in 1857, undertaken merely from a desire to explore this hitherto unknown part of the island and for his own purposes as a sheep-farmer. Accompanied by a few natives, he passed across New Zealand, from Canterbury up the Hurunui River to the lakes in the mountains, and thence down the river Teramakau on the other side to the west coast and Jackson Bay. On that occasion he had an opportunity of observing the geography of the country. There is a great dividing range, extending almost right through the centre of the island, from north-east to the south-west, about 100 miles from the west coast at the part where he crossed them, but gradually trending to the westward—so that in the Otago province the watershed line would be hardly more than 30 miles from the coast-line—and terminating in the cliffs surrounding Milford Haven and the fiords to the south. He ascended the watershed and stood upon the saddle of the range, with high snowy mountains and glaciers on both sides of him; and from that point he saw the Hurunui running to the eastward, and the corresponding river, the Teramakau, running to the westward. By following the Teramakau down from its source, as he had followed the Hurunui up to its source, he avoided the difficulties of cliffs and forests which Dr. Hector met with. It took him twenty-six days to get down to the west coast. During that time he was unprovided with necessary food, having only started with sufficient for a month, which they had to carry on their backs, and much of it got spoiled from the difficulty there was in crossing and recrossing the river, which they had to do by fording and swimming, and with their provisions on their backs, the dense impenetrable forests on both sides obliging them to keep as much as possible to the bed of the river. They were utterly destitute before they got to the coast, and had to live on native birds, which he brought down with his gun. On getting down towards the coast the river was too deep to ford, and they had to make a raft. The stream was very rapid, and in the course of a few hours they found themselves in the breakers on the beach. He met with very few natives on the coast. He went down the coast with one old man and explored: it is nothing but a long sandy beach, with a dense forest reaching up to the Snowy Mountains, every 20 miles or so broken by large rivers with bar harbours, mostly impracticable for navigation. These rivers rise, as do all the rivers of any size in the Middle Island, in the Snowy Mountains, fed by glaciers, &c., and having corresponding rivers rising in the same part of the mountains, and flowing eastward. Mount Cook stands out a grand sight about 30 miles from the coast, and the whole of the intervening country is covered with dense primeval forest. From Jackson Bay he endeavoured to strike inland, but having no provisions he was compelled to return to the point where

he struck the coast, and recross the island by his former route. The expedition took about three months.

LORD DONOUGHMORE asked if on the western coast there was any harbour or roadstead likely to give protection to shipping, because these forests then might be rendered extremely valuable.

MR. HARPER replied, there was no harbour worth speaking of until you came down to Milford Haven, in the south-west corner of the island, and all round there the coast was indented with fiords. But where the Mawhera or Grey River entered the sea small steamers had lately crossed the bar, and a settlement was being formed there, the Government of Canterbury having spent a great deal of money in opening up a road along the route which he took. A harbour on the west coast would have been a great boon, because it would have placed Canterbury in direct communication with Australia.

THE PRESIDENT asked if the fiords on the west of Otago Province were deep.

MR. HARPER said they were very fine harbours, but so deep that it was difficult to find anchorage.

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### 3. The fourth and concluding Paper was—

*An Exploration up the Moisie River to the edge of the Table-Land of the Labrador Peninsula.* By HENRY YULE HIND, M.A., F.R.G.S., &c., Trinity College, Toronto.

THIS river had been for centuries the canoe-route of the Montagnais Indians, from the Gulf of St. Lawrence to the interior, and latterly has been similarly used by the Nasquapee Indians, whose hunting-grounds are on the table-land. Its mouth is 18 miles east of Bay of Seven Islands, and its course is almost due north. The north-east branch is separated by a very low water-parting from the headwaters of the Ashwanipi, or Hamilton River, the chief stream of the table-land, 1400 miles in length, by which it is possible to navigate its course to this point, and so complete the system of canal navigation through the interior. The numerous portage-paths, by their condition, indicate the antiquity of this route. The distinguishing features of the Moisie portion of which are the constant succession of rapids, falls, and impetuous currents; alternating with lakes of widely different levels, into which occasionally may be seen half-frozen streams descending from the barren hill-tops, which in winter become masses of ice, that fall with inconceivable violence into the valley below. Where the stream becomes too rapid for the canoes to stem it there are portages, one of which occurs so low down as 45 miles from its mouth. Where the north-east and north-west branches unite (both being of about equal volume), the channel is about 150 yards wide in June. The canoe-route lies for 25 miles up the Coldwater, a small affluent rising in Trout Lake, which, singular to say, throws off two considerable streams flowing in opposite directions. In this 25 miles the river falls fully 1500 feet. Beyond this lake occurs a comparatively level lake-track, strewn with innumerable boulders,